OBITUARY: JACQUES LABEYRIE (1920–2011)

After more than 50 years dedicated to scientific research and to the dissemination of knowledge, Dr Jacques Labeyrie recently passed away at the age of 91. Upon graduating from the Ecole Supérieure de Physique et Chimie Industrielle de la Ville de Paris (1940–43), he became the assistant to Frédéric Joliot-Curie at the Collège de France. With Joliot's recommendation, he was recruited in 1946 to the Commissariat à l'Energie Atomique (CEA), where he stayed until his retirement in 1985. He was named Head of the Section d'Electronique Physique (later known as the Service d'Electronique Physique) of the CEA in 1955, which he managed until 1982.

Jacques Labeyrie in 2002 at the 50th anniversary of the Centre d'Etudes Nucléaires de Saclay (photo courtesy CEA).

It was in the late 1950s when the main scientific orientations of Labeyrie's career were chosen. With his colleagues, Labeyrie developed instruments devoted to measuring the natural and artificial radioactivity of the Earth as well as to medical imaging using scintigraphy. At the same time, with the creation of the National Center of Spatial Studies and the COPERS (later becoming the European Space Research Organization, then the European Spatial Agency), he introduced a program of observations aboard space probes and balloons. These programs eventually led to the creation in 1982 of astrophysics research at CEA. Deeply curious about the history of the Earth and the first hominids, Labeyrie created the Centre des Faibles Radioactivités in 1961, with a joint laboratory of CEA-CNRS. His objective was to use the natural and artificial radioactivity to describe precisely our planet and all the natural phenomena that marked its evolution.

Always modest, Jacques Labeyrie rarely spoke about his manager's role. He preferred to focus on scientific challenges to which geoscientists were confronted and he teemed with ideas to try to answer them. Upon entering the CEA, he began finalizing a method for uranium detection in France. To this end, he built a set of gamma detectors that were loaded on an airplane in order to detect a

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radioactive source he buried in a field near Saclay. In addition, Labeyrie continued the research from his thesis in which he analyzed the danger of inhaled dusts to the human body, in particular of aerosols stemming from the exploitation of radioactive ores. He also participated in the discovery and the exploration, sometimes dramatic, of the abyss of Pierre St-Martin. It was during this speleological exploration that he encountered, in 1952, Giuseppe Occhialini, Haroun Tazieff, and many others with which he later had fruitful scientific collaborations.

From left to right: Haroun Tazieff, André Mairey, Beppo Occhialini, and Jacques Labeyrie in August 1952 at the Pierre St-Martin. Photo: Paris Match/Archives Arsip, permission granted by Man of Science and Culture, France.

Experiments concerning dating with the ^{14}C method started at the end of 1947, after reading W Libby's article in *Physical Review* (Libby 1946). Labeyrie said he realized unofficially (in secret, he said, with equipment hidden behind a curtain at the end of a corridor) with colleague Georgette Delibrias, the first proportional counters filled with CO_2 and the first dating in Saclay at the CEA (Labeyrie 1955; Labeyrie and Delibrias 1955). One of the eruptions of the Puy de la Vache (Auvergne, Massif Central) was thus dated for the first time in 1959 at 7650 ± 350 yr BP (Pelletier et al. 1959), opening a field of knowledge for volcanologists. Numerous dating projects followed, including those of mortars of historic constructions (Labeyrie and Delibrias 1964), corals of the atolls of Mururoa (Lalou et al. 1966), and of the variations of the marine level (Labeyrie et al. 1976). He also initiated the creation of various other ^{14}C laboratories in Nancy, Monaco, Senegal, Brazil, Algeria, and Egypt. His enthusiasm for ^{14}C never weakened. He successfully pleaded in 1980 for the acquisition in France of the first accelerator coupled with a mass spectrometer (Tandétron) dedicated to ^{14}C measurement (Labeyrie 1983).

Heads of laboratories have various objectives and thus Labeyrie knew the importance of interdisciplinarity. Using ^{14}C data, he tied the rise of the dynasties of Lower Egypt to the extension of the Nile Delta due to sea-level changes (Labeyrie 1979). A pioneer in many domains, he anticipated the

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importance of climate and its variations on the behavior of human societies. He thus pointed out a way of expanding current research as early as 1985 by publishing *L'Homme et le Climat* (*The Man and the Climate*), in which the complexity of the climatic machine and the role of climate in the evolution of civilizations are described in detail. Always faithful in friendship and to his origins, he published his memoirs of his research in speleology and the Pyrenees in "The Discoverers of Pierre Saint-Martin," in which he recounted his contribution to the discovery of this exceptional abyss (Labeyrie 2005).

He always took care to explain science to the public by publishing numerous didactic articles dedicated to the latest technical and scientific discoveries in geosciences research. He shared his extensive knowledge with various audiences via radio programs (*Paths of the Science,* France Culture) and by training numerous students. After his retirement in 1985, he taught geology, oceanography, climatology, and radioactivity to students at the International University of the Sea in Cagnessur-Mer and he continued to participate in numerous conferences. Among the distinctions Labeyrie received, the Prize of Fondation de France in 1985 is dedicated to all the accomplishments throughout his career.

The radiocarbon community has lost one of its last pioneers. I was one of his numerous students. I lost not only a talented professor with an infectious enthusiasm, but also *un grand et bel ami*.

Martine Paterne
Gif-sur-Yvette, May 25, 2011

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